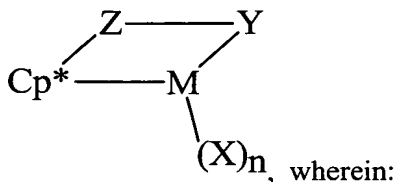


CLAIMS:

Sub A1

1. A catalyst composition for olefin polymerization comprising:
(A) a metal coordination complex of the formula:

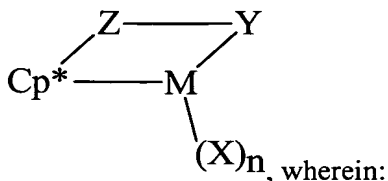


- (a) M is titanium;
- (b) Cp* is selected from the group consisting of cyclopentadienyl and R''-substituted cyclopentadienyl, bound in an η^5 bonding mode to M, wherein R'' is independently selected from the group consisting of alkyl of up to 20 carbon atoms and aryl of up to 20 carbon atoms and two adjacent R'' groups may join to form a ring and m is 1 to 4;
- (c) Z is selected from the group consisting of CR'₂, CR'₂CR'₂, SiR'₂, and SiR'₂SiR'₂, wherein each R' is independently selected from the group consisting of alkyl of up to 20 carbon atoms, aryl of up to 20 carbon atoms, and mixtures thereof of up to 20 carbon atoms;
- (d) Y is NR or PR, wherein R is selected from the group consisting of alkyl of up to 20 carbon atoms, aryl of up to 20 carbon atoms, and mixtures thereof of up to 20 carbon atoms;
- (e) X is, independently each occurrence, selected from the group consisting of hydride, halide, alkyl of up to 30 carbon atoms, aryl of up to 30 carbon atoms, aryloxy of up to a total of 30 carbon and oxygen atoms, alkoxy of up to a total of 30 carbon and oxygen atoms, cyanide, aide, acetylacetonate, norbornyl, and benzyl; and
- (f) n is 2; and
- (B) an activating cocatalyst selected from the group consisting of aluminum alkyls, aluminum halides, aluminum alkylhalides, Lewis acids, ammonium salts, noninterfering oxidizing agents, and mixtures thereof.

Sub P1
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2. A catalyst composition for olefin polymerization comprising:

(A) a metal coordination complex of the formula:



(a) M is titanium;

(b) Cp* is selected from the group consisting of indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl, cyclopentadienyl, and R_m-substituted cyclopentadienyl, bound in an η⁵ bonding mode to M, wherein Rⁿ is independently selected from the group consisting of alkyl of up to 20 carbon atoms and aryl of up to 20 carbon atoms;

(c) Z is selected from the group consisting of CR'₂, CR'₂CR'₂, SiR'₂, and SiR'₂SiR'₂, wherein each R' is independently selected from the group consisting of alkyl of up to 20 carbon atoms, aryl of up to 20 carbon atoms, and mixtures thereof of up to 20 carbon atoms;

(d) Y is NR or PR, wherein R is selected from the group consisting of alkyl of up to 20 carbon atoms, aryl of up to 20 carbon atoms, and mixtures thereof of up to 20 carbon atoms;

(e) X is, independently each occurrence, selected from the group consisting of hydride, halide, alkyl of up to 30 carbon atoms, aryl of up to 30 carbon atoms, aryloxy of up to a total of 30 carbon and oxygen atoms, alkoxy of up to a total of 30 carbon and oxygen atoms, cyanide, aide, acetylacetonate, norbornyl, and benzyl; and

(f) n is 2; and

(B) an activating cocatalyst selected from the group consisting of aluminum alkyls, aluminum halides, aluminum alkylhalides, Lewis acids, ammonium salts, noninterfering oxidizing agents, and mixtures thereof.

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- Chemical structure of a substituted cyclopentadienyl metal complex. A central metal atom M is coordinated to a cyclopentadienyl ring. The ring has substituents R at the 1, 3, and 5 positions. The metal M is also bonded to a $Si(R)_2$ group, a $Y-R$ group, and an $(X)_2$ group.

6. A process for preparing an olefin polymer comprising the step of polymerizing an olefin in the presence of a catalyst composition according to claim 4.